

Variable Conductance Heat Pipes for Radioisotope Stirling Systems, Phase I

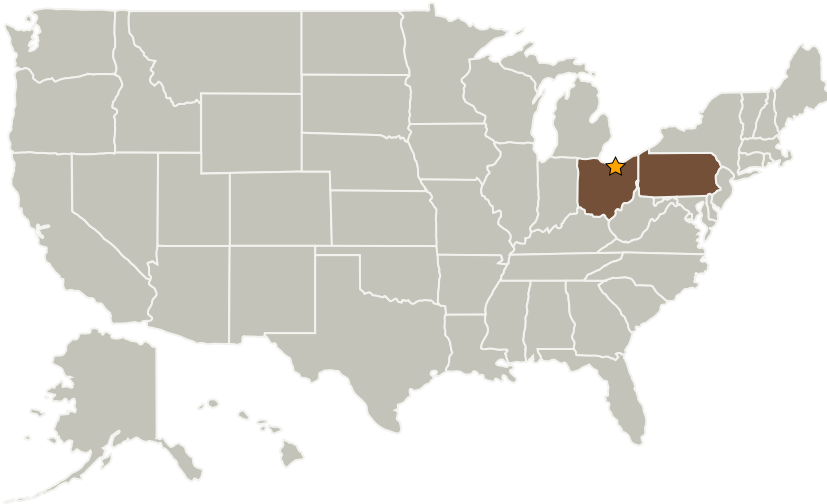
Completed Technology Project (2007 - 2007)



Project Introduction

The overall program objective is to develop a high temperature variable conductance heat pipe (VCHP) backup radiator, and integrate it into a Stirling radioisotope power system. A VCHP is similar to a heat pipe, but has a reservoir and a controlled amount of non-condensable gas (NCG) inside the reservoir. At low power, most of the condenser is blocked by the NCG. As the power increases, more and more of the condenser becomes active. This allows a VCHP to passively control the temperature while the power varies. Aluminum/ammonia VCHPs are commonly used in spacecraft thermal control. The proposed program will extend this concept to the alkali metal heat pipes that will be required for a Stirling system. During normal operation, the VCHP will be inactive. If the Stirling engine stops working for any reason, the VCHP will passively remove the heat from the General Purpose Heat Source (GPHS) preventing the GPHS from overheating. The benefits of the VCHP radiator include increased safety and reliability, and the ability to design an optimum Stirling engine.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Advanced Cooling Technologies, Inc.	Supporting Organization	Industry	Lancaster, Pennsylvania



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Primary U.S. Work Locations

Ohio

Pennsylvania

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
 - └ TX03.1 Power Generation and Energy Conversion
 - └ TX03.1.2 Heat Sources